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Reproductive Technology and Its Impact on Child Psychosocial and Emotional Development

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Introduction

Since the birth of the first baby was produced using *in vitro* fertilization in 1978,[1] advances in assisted reproduction procedures have had a fundamental impact on the ways in which families may be created. It is now possible for a child to have 5 parents: an egg donor, a sperm donor, a birth mother who hosts the pregnancy, and the two social parents, whom the child knows as "Mum and Dad."[2]

Subject

Research on the psychological development of children in assisted reproduction families has focused on two major types of assisted reproduction:

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1. **"High-tech" procedures** include *in vitro* fertilization (IVF) and intracytoplasmic sperm injection (ICSI). IVF involves the fertilization of an egg with sperm in the laboratory and the transfer of the resulting embryo to the mother's womb. With ICSI, a single sperm is injected directly into the egg to create an embryo.
2. **Gamete donation** includes donor insemination and egg donation. Donor insemination involves the insemination of a woman with the sperm of a man who is not her husband or partner. The child produced is genetically related to the mother but not the father. Egg donation is like donor insemination in that the child is genetically related to only one parent, but in this case the mother is the parent with whom the child shares no genetic link. Egg donation is a much more complex and intrusive procedure than donor insemination and involves IVF techniques.

Problems

The key problems in this area of investigation are as follows:

- The higher incidence of multiple births, preterm births, and low birthweight infants following IVF and ICSI.[3,4] The impact of these factors on child development must be considered separately from the impact of IVF and ICSI *per se*. Many of the empirical investigations have focused on families with a singleton (only) child to avoid the confounding effect of a multiple birth.
- Mothers of IVF children are generally older than mothers who give birth without medical intervention, and attempts to match natural conception mothers for maternal age have presented difficulties, as has matching for birth order of the target child and number of children in the family, although some researchers have attempted to statistically control for these variables.

Research Context

Studies in this area tend to be cross-sectional, although longitudinal investigations are beginning to appear. As the majority of parents whose children have been conceived by gamete donation do not tell their children about the nature of their conception, it is not possible to establish how children's psychological development may be affected when their parents do or do not divulge details regarding their genetic origins.

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Key Research Questions

The key research question in this area is as follows: What are the consequences of assisted reproduction for children's cognitive, social, and emotional development?

Recent Research Results

1. **"High-tech" procedures.** The early, uncontrolled studies of the cognitive development of IVF children found no evidence of impaired cognitive ability.[5,6,7,8] Controlled studies of IVF infants reported similar findings using the Bayley Scales,[9,10,11] the Brunet-Lezine test,[12] and the General Cognitive Index.[13] No evidence of delayed mental development was found among ICSI children in studies in Belgium[14] and the United Kingdom.[15,16] Although one study in Australia found evidence of cognitive impairment,[17] there were no differences between the ICSI children and the control groups when the children were followed up at age 5, at which point the sample size had increased.[18] With respect to socio-emotional development, IVF mothers in a prospective study rated their babies as more temperamentally difficult than did natural conception mothers, and their babies showed more negative behaviours in response to stress.[19] At 1 year of age, no differences between the two groups of children were found for either social development or test-taking behaviour. However, the IVF mothers rated their children as having more behavioural difficulties, and more difficult temperaments, than the control group.[20] The authors suggested that these findings may be related to the greater anxiety of IVF mothers about their children's well-being. The security of the infant's attachment to the mother was also assessed at 12 months of age using the Strange Situation procedure.[21] IVF children showed predominantly secure attachment relationships, and there was no difference between groups in the proportion classified as "insecurely attached." No differences in the behaviour of IVF and naturally conceived children have been identified in studies conducted in Belgium,[22] Taiwan,[23] Sweden,[5] and the Netherlands.[24] In addition, the European Study of Assisted Reproduction Families[25,26] found that IVF children did not differ from natural-conception children with respect to the presence of psychological disorder. An investigation of the psychological well-being of ICSI children found no evidence of raised levels of emotional or behavioural problems compared with IVF and naturally conceived children.[27]
2. **Gamete Donation.** With respect to cognitive development, two studies in Australia,[28,29] and one study in Sweden[30] found donor-insemination (DI) children were above average in terms of intellectual and psychomotor development. In the only controlled study, donor

insemination children were found to be more advanced than natural conception children with respect to psychomotor and language development.[31] An investigation of the cognitive development of egg-donation children showed no evidence of psychomotor retardation.[32] The early, uncontrolled studies of the socio-emotional development of donor-insemination children found no evidence of emotional or behavioural problems.[28,29] Although one study reported a higher incidence of psychological problems among donor insemination children than among naturally conceived children,[31] controlled studies that used standardized measures found donor insemination children to be functioning well.[25,26] In an investigation in Finland, egg donation parents were less likely than IVF parents to express concern about their child's behaviour,[33] and no evidence of psychological difficulties among egg-donation children was found in a study conducted in the United Kingdom.[34]

Conclusions

Creating families by means of assisted reproduction has raised a number of concerns about potentially adverse consequences for child development. It seems, however, from the evidence available so far, that such concerns are unfounded. There is no evidence of cognitive impairment in singleton children born as a result of IVF procedures, although the findings regarding ICSI children remain inconclusive. The reports of superior cognitive functioning among donor-insemination children have not been supported by large-scale, controlled studies could conceivably result from the use of highly educated donors. In relation to socioemotional development, assisted-reproduction children appear to be functioning well. The greater difficulties of IVF infants are based on maternal reports and probably result from the higher anxiety levels of IVF mothers. Studies of children during the pre-school years do not indicate a higher incidence of emotional or behavioural problems among assisted-reproduction children.

Implications for Policy and Services

- One of the most problematic issues associated with the practice of assisted reproduction is the high incidence of multiple births. The risks associated with multiple births in terms of perinatal mortality, neonatal problems, physical disability, and cognitive impairment have been well documented. The World Health Organization has recommended that fewer embryos be transferred in IVF procedures.[3]
- The majority of children conceived by gamete donation grow up unaware that they lack a genetic relationship with one or both parents. Although the absence of psychological

problems in children conceived by gamete donation suggests that secrecy does not have an adverse effect, this does not mean that it is better for children not to be told about the nature of their conception. There is growing concern among professionals in the fields of adoption and family therapy, and from some DI adults about the secrecy that surrounds gamete donation. In addition, the widespread use of anonymous donors prevents children who are told about their donor conception, or who find out about it, from obtaining information regarding their genetic parent(s).

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